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Toubøl, Jonas; Jensen, Carsten Strøby

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SEGMENTATION AND SOCIAL INEQUALITY IN DENMARK: THE IMPACT OF THE DANISH IR-SYSTEM ON SOCIAL INEQUALITY IN 26 INDUSTRIES

By JONAS TOUBØL and CARSTEN STRØBY JENSEN

Department of Sociology, University of Copenhagen

1. INTRODUCTION

This paper presents an analysis of the variation of the effect of the Danish industrial relations-system (IR-system) on wage formation across 26 industries covering both the private and the public sector. It is of societal relevance to explore the changes with regard to wage distribution and inequality that could be expected from changes in the IR-system as a consequence of union decline and state reforms provoked by the international economic crises.

In the late-2000s, Denmark as a total had the lowest level of inequality measured by the Gini-coefficient among the OECD countries. For the working age population the coefficient was even lower.[1] This tendency towards equality is also expressed by the fact that Denmark is the country with third lowest earning premium from education measured by relative earnings from employment by level of educational attainment (OECD 2011:138). This suggests that the Danish labor market is structured in a way which has the consequence that the returns received through wage by the individual from investment in human capital such as education, special training etc., are relatively small.

In general the low level of inequality can be explained by the extensive redistributive welfare state system (Abrahamson, P. 2010; Esping-Andersen, G. 1990). However, when we consider the low inequality in wage distribution we must consider the role played by the labor market institutions, because changes in the wage income distribution contribute greatly to the variation of the Gini-coeffient (Danish Economic Council 2011:201 et seq.). As often remarked by students of industrial relations, the Danish labor market is characterized by a high level of institutionalization with strong trade unions and employers' organizations. Wages and other labor market arrangements are as a rule regulated by collective agreements negotiated by trade unions and employers autonomously of state power. This arrangement is often termed 'the Danish model' (Jensen, C. S. 2012).

Hence, there is reason to assume that the low level of inequality cannot be explained solely by the redistributive role played by the state, and that the Danish industrial relations system influences the wage distribution independently of state power. Furthermore, the OECD data referenced above suggest that the labor market is modified by the Danish industrial relations system in a way that

[1] Source: The OECD database, http://stats.oecd.org/. Data extracted the 25th of June, 2012.

furthers equality and reduces the earning premiums from human capital such as education. How more exactly the IR system influences the wage formation and in turn how these effects varies across industries and sectors are the object of analysis in the following.

In this article we will try to estimate the impact of the institutional structures on wage formation process in Denmark focusing especially on how trade union membership influence wage formation at the Danish labour market. We will present an empirical analysis of wage differences in Denmark and use different types of theories to explain these differences. The data used for the analysis is register data including in principle all employees on the Danish labour market. The data has been collected by the national Danish statistical bureau (Statistics Denmark) and has been delivered to us by Center for Survey and Survey/Register Data (CSSR).

In the following section, we will present some general theories about wage formation focusing on Human Capital theory and on more institutional oriented theories. Secondly, we will make a short presentation of the Danish system of Industrial Relations in order to develop our arguments about how the institutions on the labour market influence wage formation and income distribution in Denmark. Thirdly, we present data and the empirical analysis including results and subsequent discussion. Finally, we conclude on the findings and discussion.

2. THEORIES ABOUT WAGE FORMATION

We will focus on two major positions within wage formation theory and use them as a theoretical framework in the upcoming analysis. Firstly we will briefly present Human Capital theory. Secondly we will present what could be called institutional wage formation theory.

Human Capital theory states that we can explain differences in wages with reference to labour's differences in qualifications. It is mainly the level of human capital (education, qualification) related to the single employee that explains differences in wages. The argument is that education is to be looked upon as an investment. The single worker considers whether it is attractive or non-attractive to take an education and relates his or her consideration to the level of return for e.g. each year of further education. It is expected that education will contribute to the marginal productivity of the single worker (otherwise employers will not give higher wages to employees with higher education).

Human Capital theory argues within a rational choice theoretical framework and fundamentally assumes that the market is transparent and the individual are behaving rational in the instrumental, egocentric and utility-maximizing sense.

When Human Capital theory is operationalized in relation to more empirical analysis of wage formation, variables as educational background, seniority, age and the like is often used in the analysis.

Institutional theory often stresses that wage formation and wage distribution is influenced by other factors than 'the market'. Different types of 'non market' institutions matters: "Labor economists who study wage distribution from a comparative perspective typically end up arguing that institutions matter, that is, that supply and demand factors alone cannot explain observed variations in wage inequality across countries." (Pontusson 2000: 293).

Institutions can be looked upon as a framework that frame the choices made by employers and employees on the labour market. Supply and demand is contextualized by different types of

institutions in a way that makes the market 'biased' for certain types of preferences. Gender relation can be looked upon as a social institution that frames the labour market and influence the wage formation (and wage differentiation) among men and women.

In this context our interest is mostly oriented toward discussing how industrial relations systems (IR-systems) – as an institutional framework for the labour market - tend to influence wage formation (and in the longer perspective wage inequality). Especially our focus is upon the trade unions and how trade union membership influence wage formation.

A number of different observations have been made in relation to the discussion about how systems of industrial relations influence wage formation. IR-systems can be looked upon as an institutional structure that in some respect decommodify the relations between employees and employers (Hyman, R. 2001; Hyman, R. 2001). Collective bargaining and collective agreements are institutions that structure the process of wage bargaining and influence the mechanisms of the market to a degree that in some instances perhaps even mute the impact of market forces on wage distribution as Rueda & Pontusson (2000) suggests backed by empirical findings. Economic theory will look upon these institutions as 'market failures' while industrial relations theory and institutional theory will stress that 'institutions matters'.

Trade unions have a special interest in influencing the bargaining process and if possible intend to demand wages above the normal market level. As stressed by Blanchflower and Bryson: "A primary goal of trade unions is to maintain and improve workers' terms and conditions, particularly workers who are members of the union, through collective bargaining with employers. Whether unions are successful depends, in large part, on their bargaining strength which is based on their ability to restrict the supply of labour to the employer and on the ability of employers to concede above-market wages (Freeman and Medoff 1984; Blanchflower et al. 1990; Blanchflower and Bryson 2010).

Similar it is argued in the literature that trade unions will try to reduce the wage differentiation among employees. Freeman argue for example "…that unions 'approximate the logic of democratic decision making (one person one vote) more than markets do, and whenever the mean exceeds the median wage, we would expect a majority of union members to favor redistributive wage demands." (quoted from Pontusson 2000: 306). Strong trade unions will – all other things being equal – increase the likelihood of seeing in a comparative perspective low levels wage and income differentiation (Rueda & Pontusson 2000).

In the following sections we will try to estimate the effects of factors that the two types of theoretical positions emphasizes as important when we shall understand wage formation, in order to analyse the variation in wage formation across industries. Before presenting this empirical analysis we shall consider what effects we should expect from institutional and human capital factors on the Danish labour market.

3. INSTITUTIONAL EFFECTS ON WAGE FORMATION IN DENMARK

In this section we make a short presentation of some of the major institutional characteristics regarding the Danish IR-system. We especially focus on the characteristics that could be expected to influence the wage formation process. Finally we will shortly discuss how these institutional

arrangements in combination with the institutional effects if the Danish educational system might influence the level of inequality. The fact that education to a great extend is free in Denmark could be expected to influence the 'return of investment' expectations among the employees on the Danish labour market.

Trade unions and employers' associations play a major role on the Danish labour market. 67 % of the labour force was organized in trade unions in 2007 (see table 1), while around 55 % of the employees work in companies organized in an employers' association (Jensen, C. S. 2012). Wages are determined either by individual negotiation between the employer and employee, or by collective bargaining between trade unions and employers associations or companies. The total collective bargaining coverage was in 2007 around 80 % and for the public and private sector the number was 100 % and 71 % respectively (Due et al. 2010:81). In Denmark there is neither legislation about wages, nor on minimum wages and wage formation is therefore mainly regulated by the market forces and collective agreements negotiated by employers and trade unions (Beskæftigelsesministeriet 2009:2). The state's absence in this process adds to the importance of the role played by the labour market institutions.

The explanation of the 'trade union wage-premium' (that is, 'how much do workers gain by being member of a trade union compared to those who are not a member') can be identified at three distinct levels: 1) at the industry or sector level, 2) at the company level, 3) and at the individual level. The effects at levels one and two can be considered collective, as they stem from collective agreements between trade unions on one side, representing the collective body of labour, and employers on the other. The effect at the third level is individual and due to some individual advantage provided by the membership of a trade union, e.g. support from union experts when the individual employee negotiate with his or her employer.

The effects at the collective levels can be conceptualized as collective goods, that is, goods that all has access to benefit from no matter whether they contribute to the production of the goods (Olson 1971). In this case, contributions to the production of collective agreements are made through membership of a trade union. Whether the collective good, the collective agreement improving wages for all employed in the company, is produced then depends on the union density: the higher the share of union members the higher the likelihood of a collective agreement because the union's bargaining power is increased.

The union density necessary for a collective agreement to be produced can be conceptualized as the critical mass. In this case the critical mass is the number of union members at the workplace or in the industry necessary for the union to be able to force an agreement on the employer(s) (Oliver et al. 1985; Marwell et al. 1988; Oliver & Marwell 1988). However, a share of unionized employees that exceed the point of critical mass will maximize the benefit from the collective good, as the bargaining power is further increased and the unions will be able to obtain a better result. For these reasons we expect that the higher the union density at the workplace or industry level, the stronger the collective effects on wage formation.

In industries or sectors with a collective bargaining coverage near one 100 % (due to e.g. different types of extension mechanisms, like the erga omnes principle in France (Commission of the European Community 2008) or an institutional setup where collective agreements are made at a centralized level), we should expect to see none or little variation in effects at the company and individual level. Every employee would be expected to have their wages set independently of their

individual trade union membership because everybody would be covered by the same collective agreement. This could however be moderated if a given collective agreement contains a high level of room for local negotiation and wage formation, e.g. if the general collective agreement stipulate decentralized collective bargaining. In that situation trade union members could be expected to have an advantage at local level compared to their unorganized colleagues. Thus, even if we should expect no variation in the collective effect at the industrial level due to 100 % coverage, like for instance the public sector in Denmark, we might see variation in the effect at the company and individual levels. Lastly, we could expect that different product market situations in different industries would influence how much trade unions will be able to influence wage formation. Different conjectural and cyclical situations would influence trade unions ability to influence wages (Bratsberg & Ragan Jr. 2002).

At the individual level positive effects could stem from the access to supplementary training because of a discriminatory practice at the workplace putting union members first in line. The unions as well urge their members to gain further training and education and thus union members might be more proactive in getting access to supplementary training and education than non-members. Other practices discriminating against non-members might also be part of the explanation.

However, these explanations are contested. As argued by Booth and Bryan it is hard to explain why a rational non-member wouldn't join the union in order to avoid discrimination (Booth and Bryan 2004:404 et seq.). Studies of the English labour market has shown, that when the information about coverage by collective agreements are included in the analysis, it is hard to detect much effect from individual membership (Booth and Bryan 2004; Koevoets 2005). However, in Denmark, union representatives often have a say in distribution of task, working hours, supplementary training and even in the process hiring, due to the extended degree of cooperation between unions and employers. Therefore, we should not rule out observed effects at the individual level due to union membership *per se*.

3.1 THE EFFECT OF THE IR-SYSTEM AND THE EDUCATIONAL SYSTEM ON INEQUALITY

It is usually assumed that trade unions have an egalitarian or wage compressing effect on wage distributions. This assumption is supported by a historical study comparing the development in wage distributions before and after the break down of the Swedish central bargaining system in 1983 (Hibbs Jr. and Locking 2000). This study shows that the effect of trade unions can be wage compressing both with regard to within as well as between industry wage distributions. We might therefore expect to see variation in the level of compression of the wage distribution between industries depending on the wage regulating institutional setup and the strength of the trade unions.

However the wage distribution, according to human capital theory should be expected to be dependent on the distribution of human capital. Iversen and Stephens (2008) argue that the high level of social protection in the Scandinavian Social Democratic welfare states lowers the risk connected with engaging in educational programs, hence encouraging investment in education (in Denmark access to education is provided for free on all levels from elementrary school to university level, and students engaged in state-recognized programs are subsidized by the state).

This generates a high general level of human capital, especially at the lower end. The high level and compressed distribution of human capital in itself compresses the wage distribution thus furthering equality. In addition, it supports the unions' pursuit of an egalitarian agenda. Hence, the presence of strong trade unions might amplify the effect of a compressed human capital distribution (Iversen and Stephens 2008). This in part explains the low level of wage-premiums from education observed by OECD, but it also points to role played by institutions, especially trade unions, which pursuit wage compression.

This leads us to expect that wage compression will follow from strong union presence at the industry level in itself but also that strong union effects may mean smaller human capital effects on wage level, thus decreasing the inequality in wage income, that otherwise would stem from variation in labour's level of human capital.

4. DATA AND DESCRIPTIVE PRESENTATION OF THE INDUSTRIES

Data used in this article is collected by Statistics Denmark comprising the entire Danish labour market. We use two databases: one containing information about various characteristics on the individual level like education, age, income etc., and one with information about various company characteristics like surplus, number of employees and so on. The two databases can be merged which enables us to combine data on individual and company level covering the total Danish labour market.

Our overall intention is to identify the effects of on the one side educational experience and on the other side union membership (individual and at workplace level), on the hourly wage. With reference to the discussion above it would have been interesting to have a variable about collective bargaining coverage on company level. Data about collective bargaining coverage is however not available. Instead we consider the union density at the workplace level.

First we estimate the effect of education and union membership at a national level. We then continue to estimate the effects at the industrial level, as the variation of these effects across industries are the primary object of the analysis.

As can be seen from table 1, which presents the mean income, years of education and union density distributed by industry and occupation, trade union membership levels differs from industry to industry implying that we could expect different effects of trade unions on the wage formation in different industries. Simultaneously, an analysis at industry level will also make it possible to take industry specific market conditions into account. Labour markets and the effects of Human Capital input (measured by educational experience) could be expected to vary from industry to industry depending on industry composition of labour and on business cycles.

In table 1 we can identify quite big differences between industries with regard to the variables we are analysing. The mean hourly wage and relative wage distribution, measured as the relative size of the standard error to the mean hourly wage in percent, vary strongly from industry to industry. The level of average human capital input and trade union density also vary a lot. The variation at the industrial level dependent on variable is greater or equal to the variation on the occupational level, which underline the relevance of investigating at industrial level. Thus, we have reason to expect

variation of the estimated effects of education, individual union membership and level of union density between industries.

TABLE 1. DESCRIPTION OF CENTRAL CHARACTERISTICS OF INDUSTRIES AND OCCUPATIONS

INDUSTRY	CASES		HOURLY EARNINGS (DKK)			YRS. OF EDUCATION		UNION DENSITY*	
	n	Pct.	Mean	SE	Pay-rate var.	Mean	SE	Workplace	General
Agriculture. horticulture. forestry	10,131	0.61%	176.03	58.745	33%	12.16	2.040	52.45%	37.76%
Fishing	396	0.02%	312.22	156.940	50%	10.80	2.304	56.49%	53.16%
Mining and quarrying	2,432	0.15%	256.36	77.498	30%	12.29	2.497	80.89%	73.89%
Mfr. of food. beverages and tobacco	47,573	2.87%	204.07	60.330	30%	11.72	2.408	80.77%	73.81%
Mfr. of textiles and leather	4,950	0.30%	184.52	54.605	30%	11.73	2.403	71.89%	67.33%
Mfr. of wood products. printing and publ.	35,213	2.12%	213.99	68.516	32%	12.49	2.372	74.54%	69.27%
Mfr. of chemicals and plastic products	39,646	2.39%	235.29	79.962	34%	13.27	2.768	73.82%	73.04%
Mfr. of other non-metallic mineral prod.	11,556	0.70%	213.65	56.217	26%	11.62	2.511	82.24%	80.63%
Mfr. of basic metals and fabr. metal prod.	134,495	8.12%	207.81	68.603	33%	12.49	2.415	79.18%	77.71%
Mfr. of furniture; manufacturing n.e.c.	17,280	1.04%	188.02	63.038	34%	11.86	2.414	76.27%	73.93%
Electricity. gas and water supply	9,222	0.56%	245.11	74.593	30%	13.43	2.259	82.45%	78.81%
Construction	120,502	7.27%	196.82	70.377	36%	12.24	2.046	71.49%	70.49%
Sale and rep. of motor vehicles. sale of fuel	33,620	2.03%	183.14	66.038	36%	12.27	1.869	63.41%	56.04%
Wholesale except of motor vehicles	96,541	5.83%	221.79	85.222	38%	12.75	2.137	63.15%	59.99%
Re. trade and repair work exc. of m. vehic.	81,513	4.92%	156.86	56.910	36%	12.12	1.944	49.76%	41.83%
Hotels and restaurants	20,518	1.24%	165.42	56.021	34%	11.75	2.048	49.53%	34.66%
Transport	61,393	3.70%	210.52	66.322	32%	11.87	2.312	70.57%	64.60%
Post and telecommunications	35,589	2.15%	204.85	77.047	38%	12.23	2.308	74.65%	67.38%
Finance and insurance	66,460	4.01%	252.00	98.021	39%	13.37	1.810	77.38%	75.50%
Letting and sale of real estate	19,569	1.18%	207.63	84.278	41%	12.67	2.236	64.70%	55.69%
Business activities	134,540	8.12%	249.36	101.336	41%	13.99	2.541	62.34%	55.31%
Public administration	101,800	6.14%	210.05	58.676	28%	13.68	2.220	89.07%	88.34%
Education	152,763	9.22%	209.72	50.450	24%	14.90	2.425	81.88%	80.03%
Human health activities	120,299	7.26%	204.75	81.953	40%	14.23	2.312	87.81%	86.31%
Social institutions etc.	229,743	13.86%	165.81	41.556	25%	12.69	2.262	80.85%	79.96%
Associations. culture and refuse disposal	68,125	4.11%	203.79	72.415	36%	12.81	2.730	73.91%	64.78%
Unknown economic activity	1,303	0.08%	183.89	80.961	44%	12.99	2.313	69.18%	50.62%
Elementary occupations	140,708	8.49%	172.66	49.828	29%	10.97	2.388	67.13%	60.73%
Plant and machine operators. and assemblers	129,895	7.84%	194.36	49.847	26%	11.12	2.337	78.91%	85.46%
Craft and related trades workers	214,341	12.93%	194.91	63.628	33%	12.40	1.891	72.06%	82.62%
Skill. agricultural. forestry and fishery workers	9,982	0.60%	177.48	56.907	32%	12.07	1.898	57.24%	58.80%
Service and sales workers	245,077	14.79%	160.12	47.236	30%	11.77	1.784	65.21%	64.65%
Clerical support workers	206,742	12.48%	181.72	53.651	30%	12.46	1.778	70.44%	73.98%
Technicians and associate professionals	420,495	25.37%	218.07	76.029	35%	13.81	1.833	75.28%	79.53%
Professionals	288,123	17.39%	264.25	88.253	33%	15.74	1.881	75.74%	78.84%
Managers	1,809	0.11%	287.69	117.749	41%	13.91	2.209	69.15%	67.48%
Entire labour market	1,657,172	100%	204.11	74.935	37%	13.03	2.479	74.66%	67.99%

* In the calculations of union density all actively engaged in employment in Denmark during 2007 are included in order to obtain the true level of union density. Thus the base is not 1,657,182 cases but 2,663,058. The data loss (see appendix) affects that the level of union density in the sample is higher than in the total population engaged in employment during 2007. Therefore the information about union the level of union density would be unrealistically high if only the cases in the sample were included in this calculation.

5. OLS ESTIMATION AND VARIABLES

In the following we will present our statistical model and the included variables in detail. Finally we will present the full model with all parameter estimates.

The favored standard estimator of union wage effects is *ordinary least squares* (OLS) estimates (Blanchflower & Bryson 2010:97; Schaarup 2009). Standard as well is to transform income or, as in our case, wages by the natural log (*ln*) in order to compensate for the right tail problem usually associated with income distributions. In our estimation of the education and union wage premium we follow these prescriptions. The natural log of individual worker *i*'s average hourly wage in 2007 ($ln\ W_i$) is estimated as,

$$(1) \qquad ln\ W_i = \alpha X_i + \beta Z_i + \delta U_i + \vartheta V_i + \varepsilon_i$$

where X_i is a vector of worker, job and workplace characteristics and Z_i is a scale variable measuring the number of years of education prescribed for the highest education obtained with the parameter β, which represents the average increase in hourly wage per year of education. U_i is a dummy variable indicating union membership and the parameter δ represents the average proportional difference in hourly wages due to the individual membership of a trade union. V_i is a scale variable measuring the union density at the workplace as the percentage of all who is working at the workplace including managers and part-time employees who is member of a union. ϑ represents change in hourly wage as union density increases. Finally, ε_i is the error.

5.1 THE DEPENDENT VARIABLE: HOURLY WAGE

Wage is measured by the variable *hourly wage*. This variable is constructed by Statistics Denmark and in the following we will clarify the procedure employed by Statics Denmark and briefly consider its properties.

The variable is equal to the wages from the job position held by the employees in November[2] divided by the number of hours worked during the year in relation to the very same job[3]. Due to sampling methods only 2.7 % of the cases included in the analysis are registered as working part-time, and one should be careful in drawing conclusions with regard to part time employees from the results presented in the following analysis. However, according to Statistics Denmark the

[2] November has been chosen as the month of Statistics Denmark's routinized data collection from businesses.

[3] The information about wages is regarded as highly trustworthy as they stem directly from the employers who by law are obliged to report wages paid to their employees to the tax authorities. However, there are some difficulties in assessing the number of hours worked during the year with regard to individuals working part time, which shall be explained in detail. There is no source of information about the exact number of hours worked by the individuals in their respective job positions. Therefore, the number of hours is estimated from the amount paid to a certain labour market pension (ATP). The amount paid depends on the number of hours worked and is not a percentage of the wage. Thus, all who work full time (>27 hours per week is the Danish norm) pays the same amount to the pension fund. However for part time employees the amount varies categorically which for instance means that the amount paid is the same for all employees working between 18 and 27 hours per week. These shortcomings are countered by using data with information about unemployment, sickness benefit, other jobs held during the year, detailed knowledge about employment in November and unemployment insurance funds. By combining these data sources a reliable estimate of the number of hours worked are produced. To maximize the reliability, the insecurity of the estimate of hourly earnings is calculated, and is used to exclude cases in which the insecurity regarding the estimated hourly earnings is larger than 50 % following Statistics Denmark recommendation. In practice this means the exclusion of 423,395 cases which mainly are employees working part time (<27 hour per week).

reliability of the estimated hourly earnings of the remaining cases has been tested by The Bureau of the Danish Economic Council, and found to be trustworthy on a general level (Danmarks Statistik 1991 & Danmarks Statistik 2009). Hence, as we in this paper do not deal with analysis of the hourly wage of individual cases, but only means of groups of (full time) employees, the results are to be trusted on this account.

5.2 INDEPENDENT VARIABLES: EDUCATION, UNION MEMBERSHIP AND UNION DENSITY

Education is a scale variable measuring the number of month that is prescribed the highest education obtained by the individual. This means that even though one might have completed the education faster or slower than the prescribed number of month, this is not measured by the variable. This is an advantage because it is hard to imagine why the market value of a given education should change because it was completed faster or slower than prescribed as it does not enhance the ability to fill the relevant occupation (See Bauer (2002) for an empirical study supporting this line of reasoning).

Individual union membership is a dummy variable measuring whether or not a tax deduction regarding union subscription is registered by the tax authorities. Thus, the information stems from the tax records and is highly reliable, as it is the trade unions who report this information to the tax authorities on behalf of their members.

Union density is a scale variable ranging from 0 to 100 % measuring the share of individuals working at the workplace who are members of a trade union. This percentage is calculated from the total population and not only from the cases included in the analyses, because the data loss causes a much higher union density in cases included in the regression analyses than among all engaged in active employment during 2007 (see appendix). Hence, if union density at the workplace was calculated only among the included cases the percentage would be unrealistically high.

5.3. CONTROL VARIABLES

The control variables are chosen because there is reason to believe that the socioeconomic events and statuses they represent could influence the hourly wage. In the selection of relevant variables we are inspired by which have been included in resent studies of wage formation in Denmark (Albæk & Thomsen 2011; Larsen 2010). In addition we have tested whether they had any significant bearing on the predictions of the model on a national level and only included those which had.

First control variable is *Work experience,* which is a scale variable, derived from the amount paid into the compulsory labour market pension (ATP). As explained with regard to the dependent variable, the amount to pay is estimated from the time worked and the payment administered by the employer this is a quite reliable source of information.

Occupation is a 9 dummy variable following the major categories of the ILO ISCO-classification minus the military which is excluded from the analyses.

Gender is a dummy variable with male as reference and female as decisive.

Sector is a dummy variable with private as reference and public as decisive. Information stems from the authorities registration of whether a company belongs to the private or public sector.

Civil status is a dummy variable telling whether the case is living as single or in some form of relationship or marriage.

Residency is a dummy variable telling whether the employee lives in the Copenhagen area or somewhere in the rest of Denmark.

Resident children is a dummy variable telling whether any children below the age of 25 is part of the household or not. It doesn't measure how many, only if any children are living by their parents.

Size of workplace is a scale variable measuring the number of people working at the workplace. As in the case of union density, this number is calculated from the total population including managers in order obtain a correct measure.

5.4. FULL MODEL AT THE NATIONAL LEVEL

First the model was fitted to data covering all 1.657.127 cases representing the total labour market excluding managers, private entrepreneurs and employers. As can be seen from table 2, adding both years of education and union density at the workplace, increases the amount of variance accounted for significantly measured by the value of the adjusted R^2.

TABLE 2. FULL MODEL

	MODEL 1		MODEL 2		MODEL 3		MODEL 4	
	β	SE	β	SE	β	SE	β	SE
Constant	5.091***	.001	4.713***	.002	4.711***	.002	4.661***	.002
Years of work experience	.041***	.000	.038***	.000	.038***	.000	.038***	.000
Years of work experience^2	-.001***	.000	-.001***	.000	-.001***	.000	-.001***	.000
Occupation								
Elementary occupations	-.241***	.001	-.161***	.001	-.161***	.001	-.162***	.001
Plant and machine operators, and assemblers	-.184***	.001	-.111***	.001	-.112***	.001	-.120***	.001
Craft and related trades workers	-.217***	.001	-.180***	.001	-.180***	.001	-.183***	.001
Skilled agricultural, forestry and fishery workers	-.238***	.003	-.190***	.003	-.189***	.003	-.179***	.003
Service and sales workers	-.212***	.001	-.154***	.001	-.154***	.001	-.149***	.001
Clerical support workers	-.155***	.001	-.119***	.001	-.119***	.001	-.118***	.001
Technicians and associate professionals	Reference		Reference		Reference		Reference	
Professionals	.201***	.001	.148***	.001	.148***	.001	.149***	.001
Managers	.168***	.006	.164***	.006	.164***	.006	.168***	.006
Woman	-.151***	.000	-.145***	.000	-.146***	.000	-.145***	.000
Public sector	-.107***	.000	-.115***	.000	-.115***	.000	-.131***	.001
Resident in the Copenhagen area	.081***	.001	.076***	.001	.076***	.001	.080***	.001
Resident children	.012***	.000	.008***	.000	.008***	.000	.008***	.000
Civil status	-.005***	.001	-.002***	.001	-.002***	.001	-.002***	.001
Size of company (1 unit = 100 employees)	.002***	.000	.002***	.000	.002***	.000	.002***	.000
Years of education after elementary school	-	-	.029***	.000	.029***	.000	.029***	.000
Union membership	-	-	-	-	.004***	.001	-.011***	.001
Workplace union density (1 unit = 10%)	-	-	-	-	-	-	.010***	.000
Adjusted R^2	.394		.419		.419		.421	
Change in adjusted R^2	-		.024		.000		.002	

Note: * denotes significance at the $p<0.05$ level, ** at the $p<0.01$ level, and *** at the $p<0.05$ level.

6. RESULTS – ANALYSIS INCLUDING INDUSTRY LEVEL

Table 3 presents the results with parameters and standard errors. The general result is that education and union density at the workplace has a positive effect on hourly earnings, whereas individual union membership has a negative effect. These results confirm the basic assumption, that the labour market institutions do influence the wage formation independently of the market. However, whereas the effect of education is positive and significant in all industries, the variation in union wage premiums is outspoken. These variations will be commented and discussed in detail below. The *Fishing* and *Mining and quarrying* industries will be excluded from this discussion because the parameters for most of the independent variables as well as the controls are insignificant.

Five groups of industries that follow similar patterns can be identified. First group is made up of the manufacturing industries with a premium from education a little below the national average, premium from union density a little above the national average and negative or insignificant parameter estimates with regard to individual union membership. If we recall the descriptive statistics, these industries share characteristics of mean hourly earnings below the general mean,

TABLE 3. OLS ESTIMATES OF CENTRAL VARIABLES

INDUSTRY	ONE YEAR OF EDUCATION		10% UNION DENSITY		UNION MEMBERSHIP	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Agriculture, horticulture, forestry	0.037***	0.002	0.005***	0.001	0.110	0.007
Fishing	-0.012	0.011	-0.210	0.010	0.233**	0.067
Mining and quarrying	0.018***	0.002	-0.005	0.004	-0.026	0.016
Mfr. of food, beverages and tobacco	0.017***	0.001	0.018***	0.001	-0.004	0.004
Mfr. of textiles and leather	0.015***	0.002	0.011***	0.002	-0.022*	0.009
Mfr. of wood products, printing and publ.	0.023***	0.001	0.011***	0.001	-0.024***	0.004
Mfr. of chemicals and plastic products	0.021***	0.001	0.009***	0.001	-0.029***	0.003
Mfr. of other non-metallic mineral prod.	0.007***	0.001	0.01***	0.002	-0.005	0.007
Mfr. of basic metals and fabr. metal prod.	0.027***	0.000	0.011***	0.001	-0.015***	0.002
Mfr. of furniture; manufacturing n.e.c.	0.016***	0.001	0.018***	0.001	-0.011*	0.005
Electricity, gas and water supply	0.026***	0.001	-0.011***	0.002	-0.025**	0.007
Construction	0.046***	0.000	0.019***	0.000	0.041***	0.002
Sale and rep. of motor vehicles, sale of fuel	0.052***	0.001	0.009***	0.001	-0.009*	0.004
Wholesale except of motor vehicles	0.030***	0.000	-0.004***	0.001	-0.023***	0.002
Re. trade and repair work exc. of m. vehic.	0.036***	0.001	0.001	0.001	-0.021***	0.002
Hotels and restaurants	0.037***	0.001	0.005***	0.001	0.004	0.005
Transport	0.012***	0.001	0.004***	0.001	0.013***	0.003
Post and telecommunications	0.013***	0.001	-0.009***	0.001	-0.033***	0.003
Finance and insurance	0.036***	0.001	-0.031***	0.001	-0.037***	0.003
Letting and sale of real estate	0.025***	0.001	-0.007***	0.001	0.006	0.006
Business activities	0.03***	0.000	-0.008***	0.000	-0.022***	0.002
Public administration	0.026***	0.000	-0.001	0.001	0.029***	0.002
Education	0.024***	0.000	0.004***	0.000	0.016***	0.002
Human health activities	0.043***	0.000	0.001	0.001	0.035***	0.002
Social institutions etc.	0.02***	0.000	-0.002***	0.000	0.022***	0.001
Associations, culture and refuse disposal	0.023***	0.000	0.016***	0.001	0.035***	0.003
Entire labour market	0.029***	0.000	0.010***	0.000	-0.011***	0.001

Notes: * = significant at the p<0.05 level, ** = significant at the p<0.01 level, *** = significant at the p<0.001 level. Dependent variable are the the natural log of the hourly wage as estimated by Statistics Denmark. Controls in the model are work eqperience and its square, 8 occupation dummies, gender, sector, residency in the Copenhagen area, resident children, single and size of company.

around 12 years of education and fairly high union density. They are also all private sector industries.

The second group is made up of industries mainly located within the public sector: *Public administration*, *Education*, *Human health activities* and *Social institutions*. Premiums with regard to education are below national average except for *Human health activities*, which is among the industries with the highest education wage premium. Wage premiums from union density are very small, insignificant or negative. However, premiums from individual union membership are high. It appears that education does not pay of especially well and you benefit from your individual membership of the trade unions, not from the collective effort of heightening the union density. These industries are all characterized by very high levels of union density.

The third group share some contra intuitive estimates: in the cases of *Electricity, gas and water supply*, *Wholesale except of motor vehicles*, *Retail trade and repair work except of motor vehicles*, *Post and telecommunication*, *Finance and insurance, Letting and sale of real estate* and *Business activities* the estimates of both union density at the workplace and individual union membership are either negative or insignificant. These industries vary greatly with respect to the average wage level, level of education, union density and wage premium from education.

The fourth group consists of industries situated in the private sector, with positive parameter estimates with regard to both union density and individual union membership. These are *Construction*, *Transport,* and *Associations, culture and refuse disposal*. With respect to wage premium from education they vary from *Construction* with the highest parameter estimate of all to *Transport* with lowest estimate of all. They all four do however share the trait of a union density and educational level below average.

The final and fifth group consists of *Agriculture, horticulture, forestry*, *Hotels and restaurants* and *Sale and rep. of motor vehicles, sale of fuel*. The education wage-premium is above average and the wage premium from union density is positive whereas the estimates of individual membership are insignificant. Union density is low, the level of education is below average and the wages as well are low.

6.1. DISCUSSION

Considering groups one and two - manufacturing industries and industries mainly situated within the public sector -, it is striking that the patterns of union wage premiums are so different given that both groups have high levels of union density. A possible interpretation is that the effect on union bargaining power originating from increased union density at the workplace level already has reached its maximum in the public sector industries. We get an indication supporting that this might be the case from the fact that the standard deviation of union density by workplace in the second group is among the lowest ranging from 22.5% to 24.4%, whereas the first group ranges from 24.1% to 26.6%, which is higher, but still below the general level. The higher level of variation with respect to union density in the manufacturing industries indicates that there might be more variation with respect to union bargaining power, which in turn explains why union density has a positive effect on wages in this group as opposed to the public sector.

Still there is reason to believe that the effects are mediated by institutional effect depending on sector. One way to interpret the results from this perspective could be that in the private sector

wages are negotiated company by company, thus union density at the workplace are an important determinant of union bargaining power, hence strongly related to the pay level. In the public sector, on the other hand, collective agreements outlining the general frames with regard to pay level are made at a more central level. Hence, bargaining power is determined by the level of union density at the general level, not the workplace level. This would explain the absence of significant relation between union density at the workplace and hourly wages.

The explanation of the negative effect of union density and membership on wages in the third group might have to do with the occupational composition of the industries. If the union effects are positive among some occupation groups in the way that unions provide wages above the market level, which in turn are compensated for by other occupational groups who are paid below market level, these groups are negatively influenced by a higher level of union density at the workplace. If the negatively influenced groups are relatively large it could explain the estimate.

Another explanation is that occupational groups, which receive very high salaries and have no tradition for being members of unions such as consultants and stockjobbers, can cause the estimate to indicate a spurious negative relation between union membership and wages because these occupational groupings 'escapes' the occupational control variable, which only considers occupation distributed on nine categories. In other words we might be dealing with a selection problem at the variable or/and case level.

Finally, because of the solidarity internally among the trade unions, some groups may be paid below market level if they follow the regulations in the collective agreement because the unions seek to redistribute among the different occupational strata or classes due to normative motivation. If some members of these groups, which are negatively influenced by the wage regulation in the collective agreement, leave the union and individually manage to negotiate a wage closer to the market level, this could explain why union membership has a negative effect on wage.

These are, however, all speculations, and further research are necessary in order to determine the correct explanation of these puzzling results.

Group four consists of industries with average wage premiums from education and positive wage premiums from both union density and membership. They all have a high share of employees with little or no education beyond elementary school, who compete for the low-paid unskilled job. These groups of wage earners are often considered difficult to organize and it is difficult to negotiate wages above market level because the trade unions do not exercise a monopoly of labour supply due to the jobs' unskilled character; no special skills or training are required as in the case of skilled jobs. If at the same time, strong trade unions are present, which organize skilled workers such as the different skilled trades of the construction industry, it explains the high wage premium from education. This premium is produced in part by the monopoly on the supply of labour to certain essential occupation which is maintained by the exclusion of workers who do not have the proper formal training of the trade. This logic explains the union wage premium from union density as well as the premium from individual membership, if membership works as an admission card to the well paid skilled jobs as well as supplementary education.

TABLE 4. GROUP CHARACTERISTICS

SEGMENT	OLS ESTIMATES' EFFECT ON HOURLY WAGE			REL. PAY-RATE VARIATION	GENERAL UNION DENSITY
	Education	Density	Membership	%	%
Group 1	Below	Positive	Neagtive	31 %	77 %
Group 2	Average	None	Positive	29 %	85 %
Group 3	Average	Negative	Negative	38 %	68 %
Group 4	Average	Positive	Positive	34 %	72 %
Group 5	Above	Positive	none	34 %	55 %

However, it is very difficult to determine whether such a segmentation logic applies, because the three industries in the group are quite different, especially *Associations, culture and refuse disposal* seems rather complex. We might get a hint when we compare this group with group five, which has high wage premiums from education, small but positive from density and none from individual membership. The main difference from group four is a much lower union density, 55% on average as opposed to 72%. The difference might simply be that within these industries the unions are too weak to exercise much influence on wage formation and as a consequence, wages are regulated almost solely by the market which is indicated the high premiums from education.

6.2 POSSIBLE EFFECTS OF MARKET AND INSTITUTIONS ON INEQUALITY

Before conclusion we shall consider some empirical indications of equalizing effects of the institutions. Table 4 summarizes the conclusions discussed above with regard to the five groups of industries and adds some new numbers. Column *Education* indicates whether the models' estimated positive effect on hourly wage is below, on average or above the national mean. Density indicates whether the wage premium from union density is estimated to be negative, positive or insignificant and the same is the case with membership. *General union density* is the mean of the union density at the workplaces. Finally, *Relative pay-rate variation* is the standard deviation of the hourly wage's share of the mean hourly wage. This measure is taken to indicate the level of inequality among wage earners in the industry as a high percentage indicates generally high differences in income among the employees and a low percentage indicates generally small differences or wage compression. In the following we shall consider the association between pay-rate variation as an indicator of inequality and the different factors influencing wage formation analysed above.

Table 5[4] displays the correlation coefficient of the different measures and the relative pay-rate variation for the 26 industries minus *Fishing* and *Mining and quarrying*. The bivariate correlation coefficients show that high premiums from education are associated with greater relative pay-rate variation and on the other hand that high union wage premiums are associated with a lower level of relative pay-rate variation. When we take the partial correlation between education and relative pay-rate variation, controlling for the effects of density at the workplace, individual membership and the general level of density, the correlation is even higher and still significant. The negative correlations of union density/individual membership and pay-rate variation are quite steady and still significant

[4] Please note that the $p < 0.10$ is chosen as the level of significance because of the very small number of cases, 24 industries.

TABLE 5. CORRELATION COEFFICIENTS FOR THE RELATIVE PAY-RATE VARIATION

	1. EDUCATION EFFECT		2. DENSITY EFFECT		3. MEMBERSHIP EFFECT		4. GENERAL DENSITY	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Bivariate	0.458**	0.012	-0.366**	0.039	-0.325*	0.060	-0.411**	0.023
Partial	0.502***	0.009	-0.390**	0.033	-0.372**	0.040	-0.289*	0.090
Controls	2. & 3.		1.		1.		1.	
Partial	0.404**	0.035	-0.426**	0.024	-0.330*	0.067	-0.341*	0.060
Controls	2., 3. & 4.		1. & 4.		1. & 2.		1. & 2.	

Notes: * significant at the p < 0.10 level, ** significant at the p < 0.05 level, *** significant at the 0.01 level. One-tailed significance test.

when controlling for the effect of education and respectively union density at the workplace and union membership effects.

These results should be treated carefully because a lot of other unobserved factors might influence the level of the relative pay-rat variation which could prove the relations implied by the correlation coefficient to be spurious. Nonetheless, the pattern of the results are quite rigorously suggesting that the effect of unions and labour market institutions on the wage formation is an egalitarian one in the sense that, inequality measured as wage distribution is higher when union presence are low and human capital effects are high and vice versa. These findings, if they still stand after further testing, support the expectation that labour market institutions regulate and contextualize the market effect in an equalizing way by redistributing income between groups of wage earners. They also support that institutional effects and human capital effects interact in a way, which means that unions reduce the human capital effect. To be clear, these suggestions with regard to the egalitarian effect of trade unions in relation to human capital factors should for now only be regarded as pointing to issues and possible thesis, which should be the object of further research.

7. CONCLUDING REMARKS

The identification of five groups of industries with distinctive patterns with regard to the wage premiums from education and trade union membership confirms that institutions matter when we seek to explain wage formation. The degree of centralization of bargaining seems to be an important variable, as was discussed in the case of group one and two situated private and public sector. Also, the level of union density at the single workplace was found to be associated with a positive effect on union wage-premium. However, if the general union density within the industry is very low, it seems that the estimated effect of union density at the workplace level shrinks.

Within some industries the union wage-premium was negative on both the account of the collective and individual effects. These results are puzzling and should spur further investigation. They may be the result of the unions actually negotiating agreements that dictates wages which are below the market level or they may be the result of methodological flaws.

The analysis of the correlation of the central variables and the relative pay-rate variation indicates that the stronger the trade union effect on wage formation the smaller the effect of human capital

factors and the smaller the inequality. If these results are correct, they confirm that trade unions have and egalitarian effect, which in part mutes the market effect on wage formation. However, these connections should be the object of further testing.

The results taken together indicate a possible case of institutional determined labour market segmentation. On the one hand we have companies and industries with weak unions without influence on wage formation, which as a consequence mainly is determined by human capital distribution resulting in a more unequal wage distribution. On the other hand we have companies and sectors with strong unions who tend to weaken the effect of the market and human capital factors resulting in a less unequal wage distribution.

APPENDIX

DATA LOSS

Only 1,657,172 individual cases of the total 3.6 million individuals engaged in active employment at some time during 2007 are included in the analysis. In the following, an account of the data loss is given.

TABLE 6. SUMMARY OF DATA LOSS

CATEGORY OF LOSS	LOSS	REMAINING CASES
Engaged in active employment 2007	0	3,595,634
Not aged 16-65	280,801	3,314,833
Private entrepreneurs, managers, assisting spuose, employer, chief executive, employee on leave	799,599	2,515,234
Reliability of estimated hourly earning	423,395	2,091,839
Military	14,682	2,077,157
Missing information	414,242	1,662,915
Occupation	*290,080*	*1,787,077*
Industry	*2,588*	*2,074,569*
Education	*29,234*	*2,047,923*
Wages	*8*	*2,077,149*
Sector	*116,420*	*1,960,737*
Work experience	*4*	*2,077,153*
Outliers (Top and bottom pro mille. DKK 25 > hourly wage > DKK 878)	3,351	1,659,564
Pilots and air traffic controllers	5,743	1,657,172

280,801 are excluded because they are not aging between 16 and 65 (16 is the age leaving ground school and 65 is the retirement age in Denmark). A group of 799,599 top managers, employers, private entrepreneurs and people whose main income did not come from wage earning have been excluded. They may be attributed a wage earning but the way their wages may be influenced by institutional regulation is indirect and incomparable to ordinary wage earners whose wages we have reason to believe are directly influenceded by collective agreements. In addition 14,628 were excluded because they are in the military which make them incomparable with employees in other industries. These are all reasonable exclusions which basically can be justified with reference to the definition of population, all wage earners who are subject to standard institutionalized regulation of the Danish labour market. More troublesome is the exclusion of 423,395 due to the estimation of their hourly earnings being unreliable according to Statistics Denmark. These are mostly individuals who on a weekly basis have worked less than 20 hours on a yearly average. Due to the way the hourly earnings are estimated the reliability of the estimate regarding employees on part time is of a

too poor quality to be trusted. We will get back to this when we consider the dependent variable, hourly earnings. In addition 414,242 cases are excluded because we do not have information regarding one or more of the variables which are to be used the analysis. The main sources are missing information with regard to the occupation of the individuals and whether to classify their workplace within the public or private sector. Finally, 3,351 outlier cases have been excluded because their hourly wages were either unrealistically low or high. The occupational groups of pilots and flight controllers were also excluded because they appeared as having received unrealistically little education compared to their ranking at the second highest qualification level of the ISCO classification (See also Albæk & Thomsen 2011:28).

TABLE 7. TOTAL POPULATION AND SAMPLE COMPARISON

CATEGORY	POPULATION IN TOTAL		CASES IN MODELS	
	n	Pct.	n	Pct.
Wage-earners in total	2,663,058	100.0 %	1,657,172	100.0 %
Private sector	1,635,767	61.4 %	990,768	59.8 %
Public sector	848,481	31.9 %	666,404	40.2 %
Sector unknown	178,810	6.7 %	0	0.0 %
Member of trade union	1,810,170	68.0 %	1,339,643	80.8 %
Part-time employees	408,771	15.3 %	36,988	2.2 %

The consequences of the data loss with regard to the level of union density, the relative representation of the private and public sector and full vs. part time employees are summarized in table 7. The data loss has resulted in an overrepresentation of the public sector and an underrepresentation of part-time employees. These are connected because 75.5 % percent of all part-time employees are employed in the private sector which is 16.8 % of the employees in the private sector compared to only 10.5 % in the public sector. It follows, that a random loss of part-time employees will change the balance between the sectors in favor of the public one. Another source of data loss is that small companies in the private sector are excused from reporting detailed information regarding their employees to Statistics Denmark. Thus, the data loss caused by missing data will be dominated employees from the private sector, thus adding to underrepresentation of private sector employees.

Also union density is higher among the cases under study. This can in general be accounted for by the relative loss of data from the private sector where union density is lower. Thus, when the public sector is overrepresented, union density will rise. However, as we only consider means and not marginal differences the results should still hold true as indications of the general relation between education and union membership on one side and hourly wages on the other, with the exception of part-time employment.

REFERENCES

Abrahamson, Peter (2010). "European Welfare States Beyond Neoliberalism: Toward the Social Investment State" in, *Development and Society*, 39(1): 61-95.

Albæk, Karsten & Lars Brink Thomsen (2011): *Er kvindefag lavtlønsfag? En analyse af sammenhængen mellem løn og andelen af kvinder I enkelte arbejdsfunktioner*. København: SFI – Det Nationale Forskningscenter for Velfærd, 11:19.

Bauer, Thomas K. (2002): "Educational mismatch and wages: a panel analysis" in, *Economics of Education Review*, vol. 21: 221-229.

Beskæftigelsesministeriet (2009): *Arbejde i Danmark - en guide til det danske arbejdsmarked*. København: Beskæftigelsesministeriet.

Blanchflower, David G, & Alex Bryson (2010): "The Wage Impact of Trade Unions in the UK Public and Private Sectors" in, *Economica*, vol. 77: 92-109.

Booth, Alison L. and Mark L. Bryan (2004): "The Union Membership Wage-Premium Puzzle: Is there a Free Rider Problem?" in, *Industrial and Labor Relations Review,* vol. 57(3): 402-421.

Bratsberg, Bernt & James F. Ragan, Jr. (2002): "Changes in the Union Wage Premium by Industry" in, *Industrial and Labor Relations Review*, vol. 56(1): 65-83.

Commission of the European Community (2008). *Industrial relations 2008*. Bruxelles: Commission of the European Community.

Danish Economic Council (2011): *Dansk Økonomi, efterår 2011*. København: Det Økonomiske Råd.

Danmarks Statistik (1991): *Arbejdsnotat nr. 31: Timeløn og arbejdsomfang i den enkelte ansættelse.* http://dst.dk/tilsalg/forskningsservice/Dokumentation/hkt4forsker/hkt4_variabel_liste_forsker/hkt4_variabel.aspx?fk=23416, visited the 30th of July 2012, 4 PM.

Due, Jesper, Jørgen Steen Madsen & Mie Dahlskov Pihl (2010): *LO-dokumentationen 1/2010. Udviklingen i den faglige organisering: årsager og konsekvenser for den danske model.* København: Landsorganisationen i Danmark.

Esping-Andersen, Gøsta. (1990). *Three worlds of welfare capitalism*. Princeton: Pinceton University.

Hyman, Richard (2001). *Understanding European trade unionism – Between market, class and society*. London: Sage.

Hyman, Richard (2001). "The Europeanisation or the Erosion of Industrial Relations?" in, *Industrial Relations Journal,* 32(4): 280-294.

Hibbs Jr., Douglas A & Håkan Locking (2000): "Wage Dispersion and Productive Efficiency: Evidence for Sweden" in, *Journal of Labor Economics*, vol. 18(4): 755-782.

Iversen, Torben and John D. Stephens (2008): "Partisan Politics, the Welfare State, and Three Worlds of Human Capital Formation" in, *Comparative Political Studies,* vol. 41(4/5): 600-637.

Jensen, Carsten Strøby (2012). *Industrial Relations in Denmark - from consensus-based conflict to conflict-based consensus*. DJØF Publishing.

Koevoets, Wim (2005): "Union wage premiums in Great Britian: Coverage or membership?" in, *Labour Economics*, vol. 14: 53-71.

Larsen, Mona (2010): *Lønforskelle mellem kvinder og mænd i 2007. Analyser for Lønkommissionen.* København: SFI – Det Nationale Forskningscenter for Velfærd, 10:10.

Marwell, Gerald, Pamela E. Oliver & Ralph Pahl (1988): "Social Network and Collective Action: A Theory of Critical Mass. III" in, *The American Journal of Sociology*. Vol. 94(3), pp. 502-534.

Oliver, Pamela, Gerald Marwell & Ruy Teixeira (1985): "A Theory of the Critical Mass. I. Interdependence, Group Heterogeneity, and the Production of Collective Action" in, *The American Journal of Sociology*. Vol. 91(3), pp. 522-556.

Oliver, Pamela E. & Gerald Marwell (1988): "The Paradox of Group Size in Collective Action: A Theory of the Critical Mass. II." in, *American Sociological Review*, vol. 53 (February: 1-8).

Olson, Mancur (1971): *The Logic of Collective Action – Public Goods and the Theory of Groups*. London: Harvard University Press.

Pontusson, Jonas (2000): "Labor Market Institutions and Wage Distribution" in, Torben Iversen, Jonas Pontusson and David Soskice (ed.): *Unions, Employers, and Central Banks. Macroeconomic Coordination and Institutional Change in Social Market Economies*. Cambridge: Cambridge University Press. Pp. 292-330.

Schaarup, Jonas Zielke (2009): "Lønforskelle på tværs af brancher" in, *Nationaløkonomisk Tidsskrift*. Vol. 147: 53-88.

Ruead, David and Jonas Pontusson (2000): "Wage Inequality and Varieties of Capitalism" in, *World Politics*, vol. 52(3): 350-383.